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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,502	09/19/2005	Jean-Pierre Catinat	271729US0PCT	5037
22850 7590 08/09/2007 OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER MABRY, JOHN	
			ART UNIT 1609	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/534,502	Applicant(s) CATINAT ET AL.	
	Examiner John Mabry	Art Unit 1609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>5/10/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "employed" in claim 14 and 16 is a relative term which renders the claim indefinite. The term "employed" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. What does Applicant intend by this term?

The term "epoxidation medium" in claim 1 and 20 is a relative term which renders the claim indefinite. The term "epoxidation medium" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. What does Applicant intend by this term?

The term "catalyst" in claim 18 is a relative term which renders the claim indefinite. The term "catalyst" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary

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skill in the art would not be reasonably apprised of the scope of the invention.

What does Applicant intend by this term? Which specific catalyst is used?

The term "loop type" in claim 20 is a relative term which renders the claim indefinite. The term "loop type" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

What does Applicant intend by this term?

The term "possible presence" in claim 11 is a relative term which renders the claim indefinite. The term "possible presence" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Does Applicant intend for presence of "at least one solvent" or not (according to wording of claim)?

The term "TS-1" in claim 18 is a relative term which renders the claim indefinite. The term "TS-1" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "TS-1" is an abbreviation and should not be used in the claims. The Applicant should spell out the term "TS-1".

The term "molar ratio is from 2 to 7" in claim 16 is a relative term which renders the claim indefinite. The term "molar ratio is from 2 to 7" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably

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apprised of the scope of the invention. What does applicant intend by this term?

Is the molar ratio of allyl chloride to hydrogen peroxide equal 2:7 ratio wherein allyl chloride is 2 and hydrogen peroxide is 7?

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 11-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-10 of copending Application Publication US 2006/0167288 A1 (Application No. 10/534299) in view of Gilbeau (US 6,063,941). Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims 11-20 and claims 1-10 of US 2006/0167288 A1 are both directed toward the manufacture of 1,2-epoxy-3-chloropropane by reaction between allyl chloride and hydrogen peroxide in the presence of catalyst, in particular TS-1; use of a solvent, in particular methanol; the allyl chloride having a 1,5-hexadiene content of less than 2000 ppm; a reaction temperature of between 45 to 80°C; a molar ratio of allyl chloride to hydrogen peroxide of from 2 to 7; the catalyst being present in a fluid bed; and the use of a reactor of loop type comprising recirculation of the epoxidation medium. The difference is that in US 2006/0167288 A1, there is no pH limitation (claims 1-4 and 6-10) or the pH is limited from 3 to 4.5 (claim 5), whereas the instant claims, the pH is required to

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be greater than or equal to 1.5 and less than 4.8. Gilbeau discloses a process for the regeneration of a catalyst, particularly a catalyst used in the reaction for the epoxidation of allyl chloride to 1,2-epoxy-3-chloropropane (epichlorohydrin), (see entire disclosure, in particular column 3, lines 44-53). Gilbeau further teaches that the effluent arising from the preparation of the epoxide can already contain the oxidizing agent and therefore can be recycled and reused to regenerate the catalyst (see column 3, lines 57-65). It is taught that the pH should be maintained at a value of at least 2 and usually does not exceed 8, preferably 7, because alkaline pH values can affect the activity of the catalyst (see column 3, lines 36-43). It would have been obvious to one of ordinary skill in the art at the time of invention to utilize any pH between the value of 2 and 8, as taught by Gilbeau, in the process of copending Application Publication US 2006/0167288 A1, since Gilbeau teaches that this is a suitable pH and that the use of alkaline pH can affect the activity of the catalyst. Further it would be routine experimentation for one having ordinary skill to modify the pH in order to determine the optimum range.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gilbeau (US 6,063,941) in view of De Jong et al (WO 96/03362).

The instant application claims a process for the manufacture of 1,2-epoxy-3-chloropropane (epichlorohydrin) by reaction between allyl chloride and hydrogen peroxide in the presence of catalyst, in particular TS-1; use of a solvent, in particular methanol; the allyl chloride having a 1,5-hexadiene content

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of less than 2000 ppm; a reaction temperature of between 45 to 80°C; a molar ratio of allyl chloride to hydrogen peroxide of from 2 to 7; the catalyst being present in a fluid bed; and the use of a reactor of loop type comprising recirculation of the epoxidation medium.

Gilbeau discloses a process for the epoxidation of allyl chloride to 1,2-epoxy-3-chloropropane (epichlorohydrin) with hydrogen peroxide in the presence of solvent, such as methanol and a TS-1 catalyst (column 3, line 44 to column 4, line 47). It is taught that the pH should be maintained at a value of at least 2 and usually should not exceed 8, preferably 7, because alkaline pH values can affect the activity of the catalyst (see column 3, lines 36-43). Gilbeau also discloses the reaction temperature is between ambient and the boiling temperature of the solution, preferably a temperature of at least 50°C and not exceeding 100°C. (column 2, lines 53-56). In example 1, the molar ratio of allyl chloride and hydrogen peroxide is 2. In example 1, a reactor equipped with a recirculation loop is utilized and the catalyst is present in the form of a fluid bed.

Gilbeau differs from the instant invention in that Gilbeau does not disclose the amount of 1,5-hexadiene in allyl chloride used.

De Jong et al discloses that it is beneficial to remove hexadienes, particularly 1,5-hexadienes from ally chloride (which is used to make epichlorohydrin) because hexadienes are a source for chlorinated by-products (see page 1, line 15 to page 3, line 3). The production of chlorinated organic by-products are toxic, thus it is beneficial to reduce their production.

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It would be obvious to one of ordinary skill in the art at the time of invention was made to utilize an allyl chloride with a minimum amount of 1,5-hexadiene as possible as used in the process of Gilbeau since De Jong et al teach that hexadienes are a source of undesirable chlorinated organic by-products that form when the hexadienes react with water and chlorine. One of ordinary skill in the art at the time the invention was made would have been further motivated to use allyl chloride with minimal amount of 1,5-hexadiene as possible as taught by De Jong. Thus, the absence of 1,5-hexadiene (or the minimum amount as possible) in the allyl chloride of Gilbeau would eliminate or reduce the formation of chlorinated organic by-products in the production of epichlorohydrin. This would result in less toxic wastewater and reduced costs as suggested by De Jong (see page 1, lines 15-29).

Claims 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strebel et al (US 6,288,248 B1) in view of Nakanishi et al (JP 04327582) and in further view of Gilbeau et al (US 6,063,941).

The instant application claims a process for the manufacture of 1,2-epoxy-3-chloropropane (epichlorohydrin) as described above.

Strebel et al teach a process for the manufacture of 1,2-epoxy-3-chloropropane (epichlorohydrin) by reaction of allyl chloride with a peroxide compound in the presence of a TS-1 catalyst and a solvent such as methanol (see column 1, line 5 to column 3, line 33). Strebel et al teaches that the peroxide compound which can be used in their invention can be chosen from

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hydrogen peroxide and any peroxide containing an active oxygen and capable of carrying out an epoxidation (see column 2, lines 29-36). Strebel et al also teaches that the molar ratio of allyl chloride and hydrogen peroxide can vary within a wide range, but is usually less than or equal to 10, particularly to 4. (see column 2, lines 49-53). Strebel et al discloses temperature ranges can vary within a very a wide range, but usually between 0° and 120°C (see column 3, lines 2-10) and the catalyst is present in the form of a fluid bed (see column 6, lines 14-15). Strebel et al discloses all of the claimed limitations except the use of an allyl chloride comprising less than 2000 ppm by weight of 1,5-hexadiene.

Nakanishi et al teaches a process for preparation of 1,2-epoxy-3-chloropropane (epichlorohydrin) which is analogous to the claimed process. Nakanishi teaches in this process, it is desirable to utilize an allyl chloride comprising 1,5-hexadiene content below 0.1% weight % (1000 ppm). The 1,5-hexadiene is converted to the by-product, 1,2-epoxy-5-hexene, by oxidation (see WPIDS abstract), which cannot be separated from epichlorohydrin by distillation. Thus, the process of Nakanishi allows one to prepare high purity epichlorohydrin more efficiently.

It is well known in the art that it is advantageous to control acidity of this reaction at a pH range of, preferably, 2 to 8 as described by Gilbeau et al (see entire disclosure in particular column 3, lines 34-53).

One of ordinary skill in the art at the time of the invention was made would have been motivated to utilize an allyl chloride having a 1,5-hexadiene content below 0.1 weight % (1000 ppm), as taught by Nakanishi along with the pH range

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as taught by Gilbeau et al, in the process of Strebelle et al because it would allow the preparation of 1,2-epoxy-3-chloropropane (epichlorohydrin) of Strebelle et al without formation of the unwanted by-product, 1,2-epoxy-5-hexene, which would form as a result of the oxidation of the 1,5-hexadiene by the peroxide used in the epoxidation of allyl chloride.

The Examiner believes that the teaching of Nakanishi is properly combinable with the teaching of Strebelle et al because they are directed toward analogous subject matter – epoxidation of an allyl chloride with a peroxide and both seek to solve a similar problem in the art – generation of undesirable by-products which are difficult to remove from 1,2-epoxy-3-chloropropane (epichlorohydrin).

Conclusion


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Mabry whose telephone number is (571) 270 - 1967. The examiner can normally be reached on Monday - Friday from 9 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Stucker, can be reached on (571) 272-0911 on Monday - Friday from 9 am to 5 pm. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

jm
JM


MICHAEL MELLER
PRIMARY EXAMINER